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(54) Title: ALKOXYLATE OF 2-PROPYL HEPTANOL AND USE THEREOF

(57) Abstract

The invention relates to an alkoxylate of the general formula (I): $C_5H_{11}CH(C_3H_7)CH_2O(B)_r(C_2H_4O)_pH$, wherein B is an alkyleneoxy group having 3-4 carbon atoms, p is 1-10 and r is 1-6. The alkoxylate may be included as a surface-active component in compositions for cleaning textile materials.

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ALKOXYLATE OF 2-PROPYL HEPTANOL AND USE THEREOF

The present invention relates to an alkoxylate of 2-propyl heptanol. The alkoxylate exhibits high detergent power on textile materials and low foaming compared with similar compounds having a hydrophobic group of approximately the same size and approximately the same HLB-value. The alkoxylate may advantageously be used as a surface-active component in detergent compositions for textile materials.

It has long been known to alkoxylate alcohols for obtaining non-ionic surface-active compounds. These compounds have been used in detergent compositions because of their wetting and dispersing properties. In a number of applications, alkoxylates of C_{8-11} alcohols have however been found to be too high-foaming and/or not to have the desired detergent power. For example, ethoxylates based on branched C_8 alcohols often exhibit acceptable foaming but too low a detergent power, whereas ethoxylates based on straight or branched alcohols having a larger hydrocarbon chain often show an acceptable surface activity but too high foaming. Thus, there is a need for new alkylene oxide adducts with an improved ratio of foaming to detergent power.

It has now been found that an alkoxylate based on 2-propyl heptanol has good detergent and wetting properties as well as low foaming as compared with other alcohols having substantially the same chain length. In addition, it has been found that the alkoxylate is easily degradable and has a surprisingly low biotoxicity. In tests, no skin-irritant effect has been noted.

The alkoxylate according to the invention can be illustrated by the formula

$$C_5H_{11}CH(C_3H_7)CH_2O(B)_r(C_2H_4O)_pH \qquad (I)$$

wherein B is an alkyleneoxy group having 3-4 carbon atoms, p is 1-10 and r is 1-6. Preferably, p is 2-8 and r is 1-4. In these compounds, the hydrophobic properties of the hydrocarbon chain have been enhanced by adding hydrophobic alkyleneoxy groups closest to the alcohol. The compounds have a good detergent power on textile materials while at the same time showing slightly lower foaming in relation to compounds having a hydrophobic group of approximately the same hydrophobicity and approximately the same HLB-value.

The alkoxylates according to the invention described above can be prepared by adding in a conventional manner in the presence of a conventional alkali catalyst, such as potassium hydroxide or sodium hydroxide, the above-mentioned amounts of alkylene oxide to 2-propyl heptanol, which is a so-called Guebert alcohol. According to a preferred mode of execution, the addition of ethylene oxide is performed using a conventional catalyst which gives a narrower distribution of added ethylene oxide than any alkali catalyst, such as NaOH or KOH. Thus prepared alkoxylates according to the invention have very low foaming. Examples of conventional catalysts giving a narrow distribution of added alkylene oxide are $Ca(OH)_2$, $Ba(OH)_2$, $Sr(OH)_2$ and hydrotalcite. The reaction is preferably conducted in the absence of free water to reduce the amount of by-products and usually at a temperature of 70-180°C.

Textile-cleaning compositions including the alkoxylate according to the invention may also contain other surface-active compounds, such as anionic ones. Examples hereof are alkyl sulphate, alkyl ether sulphate, alkyl benzene sulphonate, α-olefin sulphonate and alkyl glyceryl sulphonate. Other commonly occurring components are solutising additives, complexing agents and/or pH-adjusting agents, enzymes, bactericides and perfumes. The compositions are usually aqueous and in the form of emulsions, microemulsions or solutions.

The invention will be further illustrated by the following Examples.

Example 1

An alkoxylate according to the invention are prepared by alkoxylating 2-propyl ethanol with the amounts of alkylene oxide appearing from the Table below in the presence of potassium hydroxide as catalyst. For reference purposes, two alkoxylates were prepared using a C_{9-11} alcohol (Dobanol 91 Shell) as hydrophobic ingredient. The resulting products were analysed and structurally determined by gas chromatography and mass spectrometry. The turbidity points were measured in water or monobutylether diethylene glycol. The following results were obtained.

Table 1

Compound	Alcohol	Mole of alkylene oxide/mole of alcohol	Catalyst	Turbidity point	
				Water	BDG
1	2-propyl heptanol	4 PO+6 EO[1)]	KOH	25	-
A	C_{9-11} alcohol	4 EO	KOH	-	62
B	C_{9-11} alcohol	6 EO	KOH	56	-

EO = ethylene oxide; PO = propylene oxide,
BDG = monobutylether diethylene glycol
1) PO added first

Example 2

The foaming properties of the alkoxylates reported in the following Table were measured according to Ross-Miles ASTM D 1173-53. The following results were obtained.

Table 2

Compound	Foam height, cm	
	0 min	5 min
1	83	12
A	80	20
B	95	30

The compound according to the invention has equivalent or slightly lower foaming as compared with compounds A and B.

Example 3

Washing tests were carried out in a Terg-O-Tometer on pigment-soiled cotton and cotton/polyester. Washed-away soil was thereafter determined by conventional reflectance measurement. The following results were obtained.

Table 3

Compound	Washed-away pigment soil, %		
	Cotton	Cotton/polyester	
	40°C	40°C	60°C
1	78	73	66
A	78	65	52

From these results it appears that the compound according to the invention all in all has higher detergent power than the reference compound. From Example 2 also appears that the compound according to the invention has slightly lower foaming than the reference compound.

C L A I M S

1. An alkoxylate as claimed in claim 1 or 2, **c h a r a c t e r i s e d by** having the general formula

$$C_5H_{11}CH(C_3H_7)CH_2O(B)_r(C_2H_4O)_pH \qquad (I)$$

wherein B is an alkyleneoxy group having 3-4 carbon atoms, p is 1-10 and r is 1-6.

2. An alkoxylate as claimed in claim 1, **c h a r a c t e r i s e d in that** p is 2-8 and r is 1-4.

3. The use of a compound as claimed in claim 1 or 2 in a detergent composition for textile materials.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 93/00966

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: C07C 43/11, C11D 1/72
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: C07C, C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB, A, 2145726 (DIVERSEY CORPORATION), 3 April 1985 (03.04.85) --	1-3
A	CH, A5, 674358 (OUHADI TRAZOLLAH ET AL.), 31 May 1990 (31.05.90) --	1-3
A	EP, A1, 0046582 (CONOCO INC.), 3 March 1982 (03.03.82) --	1-3
A	US, A, 3567784 (WILLIAM T. TSATSOS ET AL.), 2 March 1971 (02.03.71) --	1-3

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 February 1994	25 -02- 1994
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Eva Johansson Telephone No. +46 8 782 25 00

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Information on patent family members

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